

IN THE CLAIMS:

- 1 1. (Currently Amended) A cell-balancing circuit ~~for a battery pack having a plural-~~
2 ~~ity of series arranged cells~~ comprising:
3 a battery pack having a plurality cells arranged in a series;
4 a bridge connected around a first cell of the plurality of cells, including a bypass
5 resistor in series with a switch; and
6 a cell monitor/regulator having an input connected across the first cell for meas-
7 uring a charge of the first cell, wherein the cell monitor/regulator closes the switch when
8 a charge of the first cell equals a maximum value.
- 1 2. (Original) The circuit as set forth in claim 1 wherein the cell monitor/regulator
2 includes a comparator that compares a relative voltage potential across the first cell with
3 respect to a reference voltage potential.
- 1 3. (Original) The circuit as set forth in claim 2 wherein the cell monitor/regulator
2 includes a voltage divider connected across the first cell and having an output connected
3 to a first input of the comparator, and a reference voltage source that outputs the voltage
4 potential to a second input of the comparator.
- 1 4. (Original) The circuit as set forth in claim 3 wherein an output of the comparator
2 is connected to a lead of the switch, the switch being constructed and arranged so that the
3 switch closes when the comparator measures a voltage at the second input greater than a
4 voltage at the first input.
- 1 5. (Original) The circuit as set forth in claim 4 wherein the switch comprises a tran-
2 sistor that is variably saturated in response to an output of the comparator.

1 6. (Currently Amended) The circuit as set forth in claim 1 further comprising bat-
2 tery pack terminals located at respective opposing ends of the ~~series arranged cells~~ cells
3 arranged in a series, and a charging circuit, the terminals being connected to respective
4 opposing leads of a charging circuit so as to charge the cells.

1 7. (Original) The circuit a set forth in claim 6 wherein the charging circuit includes
2 a sense resistor located in line with one of the terminals, a voltage sensor that measures
3 an overall voltage across the sense resistor and a regulator that determines a maximum
4 current delivered to the battery pack by the charging circuit in response to a measured
5 value the overall voltage.

1 8. (Original) The circuit as set forth in claim 7 wherein the charging circuit and the
2 battery pack each receive current from a transcutaneous energy transmission (TET) mod-
3 ule implanted in a body and the battery pack is adapted to be implanted in the body.

1 9. (Original) The circuit as set forth in claim 8 wherein the battery pack is opera-
2 tively connected to a life-saving system implanted in the body.

1 10. (Original) The circuit as set forth in claim 9 wherein the life-saving system in-
2 cludes a heart treatment device.

1 11. (Original) The circuit as set forth in claim 1 wherein the cells comprise lithium
2 ion-type cells.

1 12. (Original) The circuit as set forth in claim 1 wherein each of the cells includes a
2 respective a bridge connected around each of the cells, including a bypass resistor in se-
3 ries with a switch, and a cell monitor/regulator having an input connected across each of
4 the cells for measuring a charge thereof, wherein the cell monitor/regulator closes the
5 switch when a charge of each of the cells respectively equals a maximum value.

1 13. (Original) The circuit as set forth in claim 12 wherein the cells comprise at least
2 six cells.

1 14. (Original) The circuit as set forth in claim 13 wherein the cells comprise lithium
2 ion-type cells.

1 15. (Currently Amended) A method for balancing charge levels of ~~cells in a multiple-~~
2 ~~cell battery pack having a plurality of the cells arranged in a series~~ comprising:
3 using a battery pack having a plurality of cells arranged in series;
4 bridging around a first cell of the plurality of cells with a bypass resistor and a
5 switch;
6 monitoring a charge level of one of the cells based upon an input connected across
7 the first cell; and
8 closing the switch when the charge level of the first cell equals a maximum value
9 so as to shunt charge current around the cell through the bypass resistor.

1 16. (Original) The method as set forth in claim 15 wherein the step of monitoring
2 includes comparing a relative voltage potential across the first cell with respect to a refer-
3 ence voltage potential.

1 17. (Original) The method as set forth in claim 16 wherein the step of comparing in-
2 cludes providing cell monitor/regulator includes a voltage divider connected across the
3 first cell and having an output connected to a first input of the comparator, and a refer-
4 ence voltage source that outputs the voltage potential to a second input of the comparator.

1 18. (Original) The method as set forth in claim 17 further comprising connecting an
2 output of the comparator to a lead of the switch, the switch closing a path through the
3 bridge when the comparator measures a voltage at the second input greater than a voltage
4 at the first input.

1 19. (Original) The method as set forth in claim 18 further comprising saturating a
2 transistor in response to an output of the comparator when the comparator measures a
3 voltage at the second input greater than a voltage at the first input.

1 20. (Original) The method as set forth in claim 15 further comprising locating battery
2 pack terminals at respective opposing ends of the series of the plurality of the cells, and
3 connecting respective opposing leads of a charging circuit to the terminals at predeter-
4 mined times so as to charge the plurality of cells.

1 21. (Original) The method a set forth in claim 20 further comprising connecting a
2 sense resistor in line with one of the terminals, and measuring an overall voltage across
3 the sense resistor and regulating a maximum current delivered to the battery pack by the
4 charging circuit in response to a measured value the overall voltage.

1 22. (Original) The method as set forth in claim 15 wherein the cells comprise lithium
2 ion-type cells.

1 23. (Original) The method as set forth in claim 15 further comprising monitoring
2 each of the cells based upon an input connected across each of the cells for measuring a
3 charge of the each of the cells respectively, and providing a bridge around the each of the
4 cells, the bridge including a respective bypass resistor and a respective switch and closing
5 the respective switch when the charge of the each of the cells equals a maximum value so
6 as to shunt charge current around the each of the cells through the respective bypass re-
7 sistor.

1 24. (Original) The method as set forth in claim 20 wherein the cells comprise at least
2 six cells.

1 25. (Original) The method as set forth in claim 24 wherein the cells comprise lithium
2 ion type cells.

1 26. (Original) The method as set forth in claim 15 further comprising operatively
2 connecting the cells to a life-saving system and powering the life-saving system with the
3 cells.

1 27. (Original) The method as set forth in claim 26 further comprising implanting the
2 cells in a body and providing an external power source that transmits charging current to
3 the cells.

1 28. (Original) The method as set forth in claim 27 wherein the step of providing the
2 external power source includes transmitting energy through a skin layer of the body using
3 induction.

1 29. (Original) A multiple-cell rechargeable battery pack comprising:
2 a plurality of cells, each of the cells being interconnected in a series line between
3 a pair of opposing battery pack-end terminals adapted to receive a charge current on the
4 series line;
5 a respective cell monitor/regulator connected across each of the cells for measur-
6 ing a charge of the each of the cells; and
7 a respective shunt bridge connected across each of the cells including a switch
8 that selectively closes the shunt bridge to direct the charge current around the cell through
9 the series line in response to a measurement of the charge of each of the cells by the
10 monitor/regulator .

1 30. (Original) The battery pack as set forth in claim 29 wherein the cell moni-
2 tor/regulator includes a comparator that operates the switch to close when the charge re-
3 spectively exceeds a predetermined reference value.

1 31. (Original) The battery pack as set forth in claim 30 further comprising a casing
2 for enclosing the cells that is sealed and comprises a biocompatible material adapted for
3 implantation in a body.

1 32. (Original) The battery pack as set forth in claim 31 wherein the cells are con-
2 nected to, and receive the charging current from, a transcutaneous energy transmission
3 (TET) system adapted for implantation in a body so as to receive energy through a skin
4 layer of the body by induction.

1 33. (Original) A transcutaneous energy transmission (TET) system adapted for im-
2 plantation in a body and for powering an implanted life-saving device comprising:
3 an implanted TET module for receiving energy through the skin and transmitting
4 electricity derived from the energy to a life-saving device; and
5 an implanted rechargeable battery pack including a battery pack having a plurality
6 of series-arranged cells, having a bridge connected around a first cell, including a bypass
7 resistor in series with a switch, and a cell monitor/regulator having an input connected
8 across the first cell for measuring a charge of the first cell, wherein the cell moni-
9 tor/regulator closes the switch when a charge of the first cell equals a maximum value.

1 34. (Original) The TET system as set forth in claim 33 wherein the battery pack is
2 adapted to be charged when the implanted TET module receives energy from an external
3 TET transmitter and to discharge, so as to power the life-saving device when the im-
4 planted TET module receives one of either no energy or insufficient energy.